

## CLAIMS

What is claimed is:

1. A selective oxidizer assembly consisting essentially of:
  - (a) a feed gas inlet for directing a feed gas comprising carbon monoxide and hydrogen into the assembly;
  - (b) an injector upstream of the feed gas inlet for supplying a gas stream comprising oxygen to the assembly;
  - (c) a catalyst bed for converting the feed gas and oxygen to a process gas, the catalyst bed comprising a selective oxidation catalyst on a metal foam support; and
  - (d) a process gas outlet.
2. The assembly of claim 1 wherein the metal foam support has a pore size in the range of about 10 ppi to about 40 ppi.
3. The assembly of claim 1 wherein the metal foam support has a pore size in the range of about 10 ppi to about 20 ppi.
4. The assembly of claim 1 wherein the metal foam support has a pore size in the range of about 10 ppi.
5. The assembly of claim 1 wherein the catalyst bed has a front portion and a rear portion, and the metal foam support in the front portion has a smaller pore size relative to the metal foam support in the rear portion.
6. The assembly of claim 5 wherein the metal foam support in the front portion of the catalyst bed has a pore size smaller than 10 ppi.

7. The assembly of claim 5 wherein the metal foam support in the rear portion of the catalyst bed has a pore size of about 10 ppi.

8. The assembly of claim 5 wherein the metal foam support in the front portion of the catalyst bed has a pore size in the range of about 20 ppi to about 40 ppi, and the metal foam support in the rear portion of the catalyst bed has a pore size of about 10 ppi.

9. The assembly of claim 1 wherein the catalyst bed has a first catalyst loading in a front portion of the bed that is greater than a second catalyst loading in a rear portion of the bed.

10. The assembly of claim 1 wherein the metal foam support comprises an FeCrAlY alloy.

11. The assembly of claim 1 wherein the selective oxidation catalyst comprises platinum.

12. The assembly of claim 1 wherein the gas stream comprising oxygen is air.

13. A selective oxidizer assembly consisting essentially of:

(a) a feed gas inlet for directing a feed gas comprising carbon monoxide and hydrogen into the assembly;

(b) an injector upstream of the feed gas inlet for supplying a gas stream comprising oxygen to the assembly;

(c) a catalyst bed for converting the feed gas and oxygen to a process gas, the catalyst bed comprising a selective oxidation catalyst on a metal foam support;

(d) a process gas outlet; and

(e) a precoolers upstream of the injector for supplying the feed gas to the feed gas inlet at a temperature at or above an ignition temperature of the catalyst.

14. A method of selectively oxidizing carbon monoxide to carbon dioxide, the method comprising:

(a) supplying a feed gas comprising carbon monoxide and hydrogen to an assembly consisting essentially of

a feed gas inlet for receiving the fuel gas,

an injector upstream of the feed gas inlet,

a catalyst bed comprising a selective oxidation catalyst on a metal foam

support, and

a process gas outlet; and

(b) supplying a gas stream comprising oxygen to the injector.